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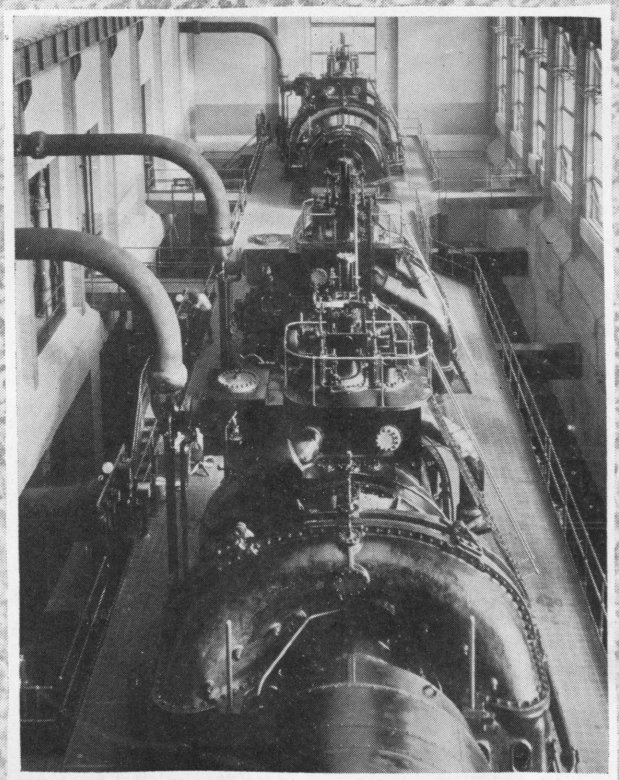

OCTOBER
1929

VOL. XXXIX TERRE HAUTE, IND. No. 1

Member of Engineering College Magazines Associated

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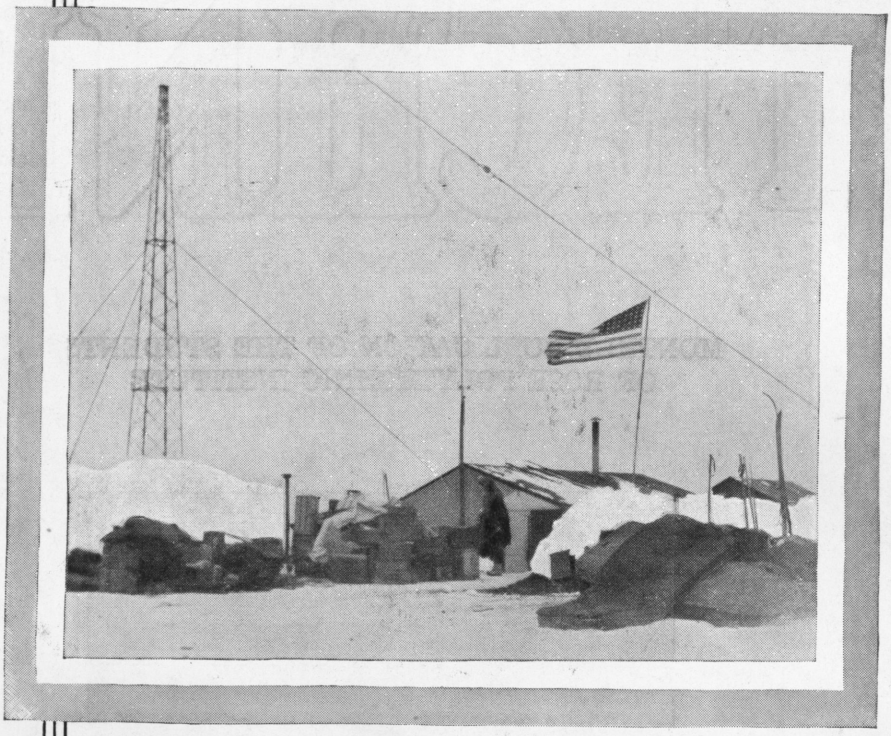
WHAT YOUNGER COLLEGE MEN ARE DOING WITH WESTINGHOUSE



The Base Station in Little America, where the Antarctic explorers spent the winter. (Photo copyright 1929 by the New York Times Company and the St. Louis Post Dispatch)

The radio that's heard at the bottom of the world

Six months of night did not mean dreary isolation for Commander Byrd's hand-picked band of Antarctic explorers. Fortnightly the Westinghouse short-wave radio station in East Pittsburgh sent them programs of music and cheer and word from their families. Between scheduled programs it lent a helping hand in sending down interesting bits of news, relaying messages for other stations that couldn't get through, and even completing connections between the "Eleanor Bolling" and Byrd's Base Station when they did not hear each other.

Spectacular feats have been achieved by the Westinghouse men working on short-wave radio research, in reception as well as sending. An average of five nights a week they bring in 5 S W of Chelmsford, England, and re-broadcast to America the midnight chimes of Big Ben. Strange voices from Holland, Australia and far off Java and the Fiji Islands register on their receivers quite as faithfully as a station a thousand miles distant comes in on the average set. Many stations in remote corners of the world depend on their broadcasts for entertainment and up-to-the-minute news.

Young college men figure prominently in the exploration for new possibilities in radio communication. Their field is rich in opportunity — their facilities are the finest that modern science affords.

Westinghouse

WESTINGHOUSE ELECTRIC

THE ROSE · TECHNIC

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VOL. XXXIX OCTOBER. 1929. NUMBER 1

TABLE OF CONTENTS

Engineering College Magazines Associated
Mr. Williard V. Merrihue, Chairman, 1 River Road, Schenectady, N. Y.

MEMBER MAGAZINES

Armour Engineer
Colorado Engineer
Cornell Civil Engineer
Illinois Technograph
Iowa Engineer
Iowa Transit
Kansas Engineer
Kansas State Engineer
Michigan Technic
Minnesota Techno-log
Nebraska Blue Print
Ohio State Engineer
Penn State Engineer
Princeton News Letter
Purdue Engineer
Rose Technic
Sibley Journal
Tech Engineering News
Pennsylvania Triangle
Oregon State Technical Record
Wisconsin Engineer

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The power of a man increases steadily by continuance in one direction. He becomes acquainted with the resistances and with his own tools; increases his skill and strength and learns the favorable moments and favorable accidents. He is his own apprentice, and more time gives a great addition of power, just as a falling body acquires momentum with every foot of the fall.

—Emerson.

A Four Year Course at Rose—How Much Will It Cost Me?

Carl W. Scharf, ch., '29

Introduction and Comments by Prof. John B. Peddle

The problem of financing a college education is a serious one for many of our students who come from homes where the family income is small. It is often impossible to give the boy much more than his board and room at home and sometimes not even that. Under these circumstances the boy must depend on himself for his expenses and he will meet them by working during school time and vacation or by borrowing, or both.

There is a general feeling that a student cannot go to school, and at the same time earn much money, without serious danger to his scholastic standing. Perhaps this is true in many cases but I am inclined to think that it is not necessarily so for all or even most of them, and that a failure to do more is often the result of a lack of initiative and determination rather than because of any inherent impossibility. The main thing, I believe, is to budget both expenses and time and when these schedules are once laid out to stick to them.

We have recently had a very remarkable case in which a student came to us in the Freshman year with about $400 to his credit in the bank and who graduated last June with a bank balance of $900, having had no outside help in the meanwhile. This man, Carl W. Scharf, not only worked this financial miracle but received the Heminway gold medal for the highest standing in his class for the four years he was here. He took a reasonable part in campus activities, was a letter man on the track team, won three medals on the rifle team, was elected to the honorary fraternity, Tau Beta Pi, won a McGregor scholarship of $150.00 each year he was in school, took additional elective credits in advanced military and was an important and valuable member of the governing body at the dormitory. Naturally, Mr. Scharf could not have done all this if he had not been an unusual man but I believe that his accomplishments were due less to his superior mental equipment than to his grit and determination—qualities which may be cultivated by anyone if he does not have them naturally.

High scholastic standing cannot be attained by everyone but by following the plan mentioned in Mr. Scharf's paper it would seem to be possible for even the ordinary student to make his expenses without seriously endangering his standing.

I have asked Mr. Scharf to write out the story of his financial adventure in the hope that it will be an inspiration to others who have to make their own way and with this preamble I present his account.

THIS question is vital to the young man who plans to work his way through college. It is of no small concern to those parents of moderate financial means who desire to help their sons get a college education. To those who are not primarily concerned with the financial burden, the information concerning it is nevertheless desirable in order that the parents may estimate the amount that is really required.

It is impossible to make a definite statement concerning the actual amount of money it will require for a year's course. Each student will use a different amount. Such factors as home training, previous manner of living, and general conduct have a decided effect upon the amount of money that it will take to get the college training.

In addition to the difficulties named above, there is another element in the question as stated in the subject that is not a definite quantity. That is cost. What is cost? Does it mean the number of dollars paid out for tuition, fees, living expenses, etc.? That is one interpretation of it, but the true cost also includes the earning power of the student for the time spent in the classroom and at study. In some cases this earning power amounts to practically nothing while for other students the time spent in school represents a period of their most vigorous youth and work that can be done in this time is an important item. From these facts it is evident that the often asked question, How much does it cost to go to college?, involves a number of variable factors. It is not the purpose of this article to attempt an extended economic treatment of the subject, but the cost as ordinarily thought of, the actual money paid out, will be considered. In doing this it will be necessary to assume certain conditions in order to get exact figures. One or two typical cases will be sufficient to give an outline from which anyone can work out his own individual problem. And, if one stops to think, there is no secret concerning the matter of financing an educational course. The figures for the fixed expenses of the school can be obtained easily and one can compute his own personal requirements for a period of time with a fair degree of accuracy. These figures can be put down, added, and there is the total expense. This is all very simple. The student knows how much money he has to start with, and he knows or can find out how much he can borrow. Judging from past work he can estimate how much he will be able to save each summer. His earning along with school work is an uncertain amount, but it can be estimated or omitted with the knowledge that if it is omitted any money earned at that time will be "profit." Now with these figures before him, the student can judge immediately whether he can meet the expenses easily, whether he is going to have a hard task, or whether he can do it at all. This method of computing the cost of the course is indeed very simple, but there is one little item that has been overlooked in this solution, and that is this—no one will do it. That is to say, rather than take a couple of hours or even one hour at the beginning of the school year to figure out exactly how much money to spend, where to spend it, etc., the student will spend the nine months of the school year with his mind in an uncertain state as how much money he can spend, whether he can go to a show, whether he can do this or that, etc.

The student who has a budget or schedule doesn't have to worry because he knows just how much he can afford and just how far his money will go and therefore judges his expenditures accordingly or works on the outside to make up any deficiency. Therefore the problem of finding out the cost of the year at school and whether or not it can be met resolves itself into the following simple steps:

1. Checking up on one's financial condition to determine the amount of money he has or can borrow.

2. Carefully analyzing one's self to determine how much it will require to live reasonably for a period of a year, and to determine how much of this can be earned during summer vacations, week-ends, during school days, holidays, etc.
3. Putting the items as obtained above in some tabular form so that the contemplated expenditures and income can be compared.

For one who is starting into a new kind of life, it is perhaps reasonable for him to think that there may be expenses that he cannot think of or does not know enough about to make an estimate: Typical cases will be considered in which the steps mentioned above will be taken into account and outlines made to show just how to go about making out such an estimate.

The first step should give no difficulty. Fortunately, or sometimes unfortunately, one's financial condition is easily determined.

In the second step of the above outline, the following items demand attention:

Tuition and fees.
Books and supplies.
Board and room.
Small expenses (paper, pencils, ink, etc.)
Clothing and shoes.
Laundry and pressing.
Entertainment.
Bus fare, transportation.
Toilet articles and haircuts.

Perhaps there are more items that could be mentioned than occur in the above list, but a careful examination shows that those are sufficient and all that are necessary for the student.

There is no reason why any young man should not go to college merely because he does not have the money. Read this article and see what one Rose man actually did and what he thinks about it.

Concerning one's ability to work and earn a part or all of his expenses, the following questions should be answered:

Do I want to work?

Can I work on Saturdays and holidays?

Judging from previous summer work, how much can I save during this season toward school expenses?

In order to make clear how these items are to be listed as called for in the third step, two cases will be considered. One of these will be the case of a student living outside of Vigo County but within daily commuting distance of school, and the other, a student living at a distance and staying at the Rose Dormitory. The items in each case will be listed so that any one whose conditions are not duplicated can alter the items to conform to his own situation. The figures are given on the yearly basis. The expenditure per year from the freshman to the senior year need not vary a great deal. The student perhaps finds more places to spend money, but on the other hand, he also learns how to manage his affairs more ably and his earning power should increase in a compensating manner.

The following is a list of the expenses for a thirty-six week school year. In some cases it is easier to figure out the items by the week and get the total by multiplication. This list is for a student living outside of Vigo County and within daily commuting distance of Rose.

ITEM	COST Weekly	36 Weeks
Tuition and fees	.....	$180*
Books and supplies	.....	40**
Board and room	.....	(home)
Clothing and shoes	.....	50
Laundry and pressing	.....	(home)
Entertainment	1.00	36
Transportation	2.00	72
Toilet articles and haircuts	.50	18
Small expenses (paper, pencils, etc.)	.25	9
Total		$405

* This includes ten dollars for breakage. After the first year this may be less depending upon the amount of damage done.

** For the freshman year this includes shop tools and drawing set. A slide-rule will increase this amount if bought in the first year. In the succeeding years, twenty-five dollars will cover the expense of books and supplies for the year.

Taking the total of $405, the student may use the following methtods of cutting it down:

	$405
A week-end job earning $3.00 for 36 wks.	108
Balance	297
Summer's savings	100
Balance	197
Scholarship	150
Balance	47

If one is able to save $150 in the summer he can entirely support himself or if he makes more in some other way he can add the amount in the proper place and get the result.

The following is a similar outline for a person living at the dormitory:

ITEM	COST Weekly	36 Weeks
Tuition and fees	.....	$180
Books and supplies	.....	40
Board and room	.....	350*
Clothing and shoes	.....	50
Laundry and pressing	1.00	36
Entertainment	1.00	36
Transportation (bus fare)	.25	9
Toilet articles and haircuts	.50	18
Small expenses	.25	9
Total		$728

* The rooms vary in price; this is the maximum; the cheaper ones are twenty and forty dollars lower.

This total amount may be cut down in the following manner:

	$728
Week-end job	108
Balance	620
Summer's saving	100
Balance	520

Scholarship	150
Balance	370
Earning board	230
Balance	140
Earning also room	120
Balance	40

By careful planning the student may be able to find a means of obtaining the final forty dollars. This can be done most easily by increasing the summer's savings because the schedule as outlined above is well filled during school time.

It is understood that the above figures indicate possibilities. From them it is possible for the student to estimate his own probabilities. It is well for the beginning student to bear in mind that, for the first year, he cannot expect to be able to use a large amount of his time in outside work. The adjustment necessary for the new school work requires the greater part of the average student's energy. On the other hand it is entirely possible for the student to do better than the above schedules indicate and actually save money during the four-year course. In any case, it is essential for the student to make out a budget or schedule and then keep a strict account of all money in order to see if the budget can be kept and to gain information that will be of great value in the succeeding years.

The conclusions to be drawn from the above information are these: The facts are before the student; if he wants to add more he has only to increase the proper figure or put down an extra item and the amount. If he can cut down on some item in his own list he may do so. The above figures are made up from actual records kept during the school course, and from the school catalog. This does not mean that everyone can or will live on the amount set down or earn the amounts indicated. Only a few will earn scholarships. In the matter of entertainment, for example, ten times the amount listed above may be spent by some students. There is also the matter of fraternities. The expenses connected with these organizations are considerable and each student must decide whether or not the cost is justifiable. There are a great number of places to spend money—more than there are to earn it easily. At college the young man is more or less for the first time on his own responsibilities. It is a splendid place for him to begin thinking in economic terms instead of it being a hotbed for the growth of carelessness and detrimental habits in the use of his own or his parent's money.

Upon receipt of the above account I wrote to Mr. Scharf that in my opinion his presentation was too theoretical, that as a paper project it looked well but that I feared that it would fail to carry conviction to the average reader unless it could be shown to have been put to a practical test. I therefore asked if he could not supply some personal data, and in reply I received the following letter. I believe that this will dispel any doubts as to the practicability of the scheme and that it gives the necessary personal touch to insure its acceptance as a genuine experience.

Bell Telephone Laboratories,
New York, New York.

Dear Professor Peddle: Sept. 6, 1929.

This morning I received your letter acknowledging receipt of my letter and article.

I can understand how the material in that article would seem a little like mere paper work and not facts. However, I did it that way rather than put down my actual figures because I thought it would be more easily applied by the student in his own case. Also there are some things which are real in an individual case but which cannot be evalued to fit anyone else of a group. For example: The first year I went to Rose, I went back and forth daily from Brazil. By using mileage tickets, this would have cost me about $1.40 per week or close to $60.00 for the year. I was fortunate in catching rides and my fare for the entire year was less than $10.00. A saving of $50.00 is considerable, but I couldn't justify myself in putting that on a schedule for some one else. It would be like putting a statement like this in the school catalog: " . . . The school is located on the National Highway affording excellent chances for bumming rides into the city and nearby towns." And yet if one were to figure out how much money is saved this way, I imagine he would be surprised.

Also concerning the matter of earning money during school. I put it at three dollars per week for working on Saturdays. In my own case I did not work every Saturday because a number of track-meets were held on that day, and last year thesis work took up several Saturdays. However, I saw early in the year that this was going to be the case so I helped my budget by working Christmas holidays, final exam week, and doubled up when I could. As a result, at odd jobs last year I earned $121.40 as compared with the value of $108 as given in my schedule. This is just one example to show that the figures given there are not mere figures. I made them conservative so that they would seem more reasonable.

I remember one instance of shoveling off a half-car of coal after military on Friday afternoon and evening and then going to Brazil to work the next morning thus making double wages for the week-end. I didn't make a practice of doing this but in this way it was possible to keep to my financial schedule and at the same time do outside things.

At the end of my Junior year I had $70.00 less in the bank than I had the previous September at the start of the school year. Last June I had $80.00 less than I had last September. The first two years were just about the same. As I was able to save considerably more than this in the summer vacations, I started each year with a somewhat larger bank account. When I started as a Freshman I had a little less than $400 (I haven't the exact figure here). When I graduated last June, I had slightly more than $900. Thus, in round numbers, during the school course with three summer vacations, I was able to completely support myself and save $500.

I hope that these figures will help to show that the schedules in my previous article are something more than ideal computations. They were conservative in my case because I was able to meet every condition that is listed there and more too. And I didn't do it at the expense of my studies and health, but, on the contrary, to the betterment of both.

I think then, Professor, that the best answer to the person who says that the program as I outlined it is only an ideal one would be, "It has been done."

Sincerely yours,
(Signed) Carl W. Scharf.

The Refining of Crude Petroleum

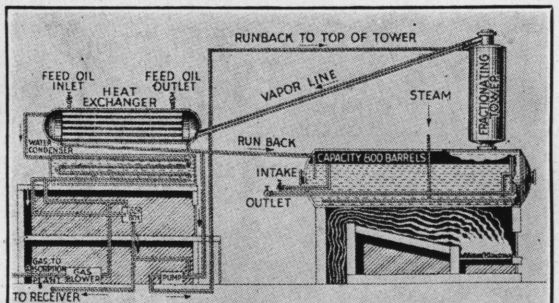
C. R. Plock, m, '29

TODAY the process of refining petroleum is one of America's great industries. In the last few years many large refineries have been built to take care of the ever increasing demand for gasoline, until today it seems that almost every locality is equipped with a plant for the sole purpose of separating the gasoline, kerosene, and the various gas and lubricating oils from the crude. It has indeed become one of our most important industries, giving employment to a very large number of men.

Gasoline is naturally the product most in demand. And no wonder. The latest compiled statistics show that for every five persons in the United States there is one motor vehicle. And that means the automobile has become a family necessity, with practically one for every home. Furthermore, a census of almost any city, town or country will bear out that statement—the family without the car is becoming a rarity.

But there are many products obtained from the crude other than gasoline. In the average refining process there are approximately one hundred by-products, all of which have their uses, and practically all have their own particular method of extraction, in the final stages at least.

Crude petroleum consists of a mixture of the various complex hydrocarbons, all chemical compounds of hydrogen and carbon in varying proportions, the simplest having one atom of carbon and four of hydrogen (marsh gas) and going up through the waxes, some of which have thirty-two atoms of carbon and sixty-six atoms of hydrogen per molecule. The separation of these various groups would be a rather difficult matter were it not for the fact that each has a different boiling, melting, or crystallizing point, and they therefore can be separated by distillation, sweating, or crystallization.



THESE STILLS OPERATE CONTINUOUSLY IN BATTERIES OF TEN. THE COLD OIL PASSES THRU THE EXCHANGERS, WHERE IT IS PREHEATED. THEN THRU THE STILLS AS THE OIL FLOWS FROM THE COLDEST TO THE HOTTEST STILL. CERTAIN FRACTIONS ARE DISTILLED OFF IN EACH.

FIG. 1. CROSS-SECTIONAL VIEW OF A PIPE STILL

Business competition today forces the refiners to use the quickest and most economical methods of production. Such methods have developed, and are being developed, to a satisfactory state until today the refinery is really of great engineering interest.

With such thoughts in mind, the writer made a trip to the refinery of the Lincoln Oil Co., at Robinson, Illinois, a plant employing modern methods. The plant is practically new, construction on it having been started a little less than two years ago, and therefore it embodies the latest and most economical means and methods for refining crude oil into gasoline and other by-products. In fact, it is a typical up-to-date plant.

The crude consumed in this particular plant is pumped in from wells in the two adjoining counties. It is of a peculiar nature, having a mixed paraffine and asphalt base.

The bore for the average well needs to be sunk 3,000 feet and through varying strata usually consisting of surface oil, dry sand, and then at a depth of 1,000 feet of a layer of brown shale. Below this comes oil sand and blue shale and at approximately 2,000 feet a stratum of rich oil sand is encountered. Below this level there is a bed of limestone and then at 3,000 feet a gas pocket is struck. Directly under this the oil bed is found. Naturally each particular field has its own peculiarities—the above merely being an outline of the most common occurence, and a statement of the strata as found in the oil fields for the Robinson plant.

From the wells, the crude oil is pumped to the tank farm near the refinery. While in storage there, the extremely volatile oils evaporate from the surface of the crude. Economy again rules, however, for these vapors are collected and piped to a central reducing plant thereby effecting a saving of what otherwise would have been a total loss. Practically nothing is wasted in the process; there being a commercial market for each product. From this angle, the process has become quite involved.

From the tank the oil is pumped through a preheater into the "Cross" pipe still, the capacity of which is 5,000 barrels per day. Fig. 1 shows a section view of such a pipe still. At the Robinson plant there is a battery of two of these stills. The preheaters utilize some of the heat of the outgoing vapors from the still and raise the temperature of the oil to about 250 degrees. The cold oil passes through the heat exchangers, where it is preheated, and then through the stills. As the oil flows from the coldest to the hottest still, certain fractions are distilled off in each. This pipe still operates at a very low pressure and at 800 degrees F. Approximately three-fourths of the available 28 per cent of gasoline flashes off in the preheater. The stills are fired by gas burners on three of their sides. The vapors from the pipe stills are sent through two heat exchangers, or reflux condensers. This causes the heavy ends to be separated out first, and the lighter ends to come off later in the fractioning process. This is the exact opposite of the ordinary operation, where the gasoline is the first cut, the kerosene the second, the gas oils the third, the wax distillate the

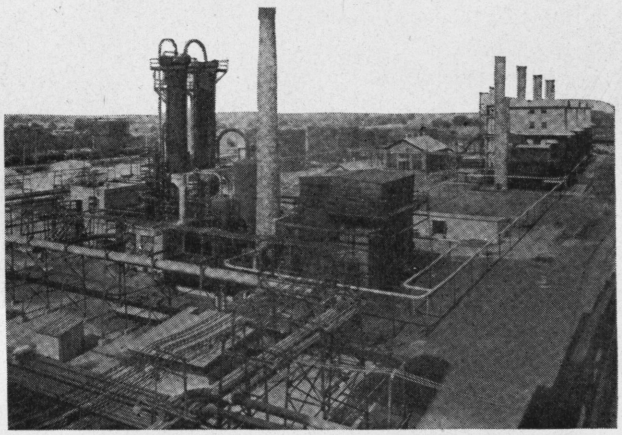
*(All photos courtesy Standard Oil Co. of Indiana.)

fourth, and residuum remaining after all of the above have been made.

The residuum in the first tower, amounting to about 18 per cent with a Baume gravity of 14, and a flash point of 450 degrees is sent to the blowing stills, where it is reduced to road oil, heavy fuel oil, or solid asphalt.

The heavy lubricating oils come off next, with the wax oils following this fraction very closely. The distillation of the wax oils is a very interesting process. This wax oil is sent to the shell stills where the wax content of the oil is changed, by cracking, from an amorphous to a crystalline state, which upon cooling may be separated from the oil by running at 800 lbs. pressure through a chilled, screw-shaped conveyor, with the refrigerating medium encasing the pipes. From the chilling machines, the cut is piped to a press where the wax is separated from the oil. These presses consist of a long series of canvas filter assemblies held by a disc ring about four feet in diameter. There are two of these units, each about thirty feet long.

Under the heavy pressure and low temperature the wax, or paraffin, is separated from the oil by the canvas discs and is allowed to collect inside the press for periods of from 18 to 24 hours. The oil passes through the canvas and drips into gutters on the floor. This oil, after careful refining, becomes the basis for blended motor oils. The wax must be refined by "sweating" to remove all oil, and bleached by passing through fuller's earth. Almost all the wax is sold to European consumers who make it into candles.



PANORAMA OF LINCOLN OIL CO. REFINERY

Gas oil is the next fraction to come off, and is used as charging stock for the cracking stills. Now comes the beginning of the greater part of the industry. Time, pressure, and temperature are the important factors utilized in cracking. The stills are four in number, all of Holmes-Manley make, and operate at a pressure of 400 lbs. per sq. in., and at a temperature of from 800 degrees F. to 1000 degrees F. The charging stock is made up of 60 per cent virgin gas oil, nearly 40 per cent recycle oil, and the remainder of wax distillate. The charge is first run through a superheater which raises the temperature to about 800 degrees F., and where it is almost entirely changed to a vapor state. Four of these preheaters are used, each one being 40 feet long and from 8 to 10 feet wide. Each of the four stills is equipped with curved-blade scrapers so as to keep the crude oil from clogging against the side of the vessel. The furnaces for the stills are fired with mechanical oil burners, giving a CO_2 content of 13 per cent and using 45,000,000 cu. ft. of gas per month, which is a by-product of the cracking operation itself. Connecting the stills is a series of drag lines at the bottom and a series of equalizing lines toward the top. Any coke that may be contained in the crude is formed in still No. 4. The average amount of coke collected during a ten day run is 15 tons.

The charging stock, the constituents of which have been mentioned, enters the bubble tower, thence through the preheaters to the stills themselves, and as the vapors come off, the various products are directed to the proper points. As a result of this process, there is gasoline that needs to be taken to the recovery plant, pressure tar, used for road oil, but primarily a substance known as a pressure distillate. This last mentioned is put through a re-running still, similar in appearance and operation to the pipe or crude still, and yields in part the same cuts—gasoline, kerosene, and residuum.

Kerosene is the next fraction to come off, it having a Baume gravity of about 41-43. It is run through the "doctors" solution and then redistilled to about 45 Baume gravity so as to improve the burning qualities and to take out the tar and the like. Kerosene is not an important product in the Lincoln Refinery although it is in most refineries. It is used as tractor fuel.

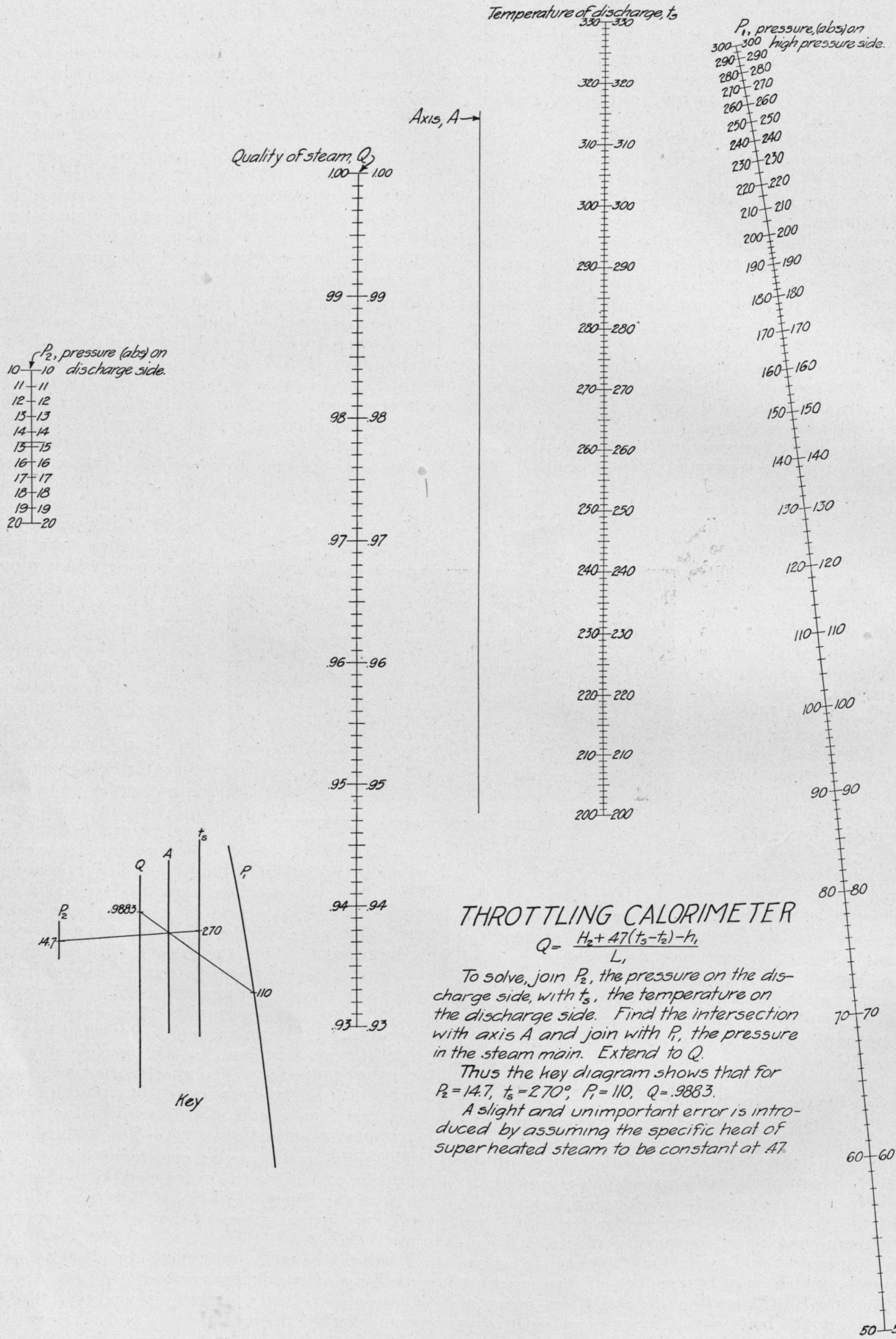
The final fraction to come down in the towers of the pipe stills is gasoline—by far the most in demand of the products. The naptha goes clear through the process and is piped into a water cooled condenser and condensed out.

Let us follow the gasoline cut through its progressive stages until it becomes a marketable product. The first thing done is to remove the impurities, such as sulphur, gum forming bodies, etc. This is accomplished in a chemical treating and sweetening plant, in which ammonia is used to neutralize the acid, and sodium plumbite as a sweetening agent. Other chemicals employed are sulphuric acid to take out the tars, caustic soda for a neutralizer, and "doctors" solution to cut the sulphur content to one-tenth of one percent. Now, the gas cut, with the impurities removed, is directed to a battery of re-running stills, where the various grades of gasoline are separated according to Baume gravity, flash and fire tests, viscosity, etc. Again the gas is subjected to a chemical treatment, this time for the purpose of removing the color and odor. The gasoline is now ready for marketing, to be purchased by practically every American family and affording them the power for the common method of travel—the automobile.

The refining process, as mentioned above, is fairly complete, and gives the exact method used in the refinery of the Lincoln Oil Co. at Robinson, Ill., with a total loss in the entire process of not over two per cent.

It might be well, however, briefly to mention something of the boiler room and of the equipment that so satisfactorily furnishes the power. The boiler room contains three Babcock and Wilcox boilers

(Continued on page 10)



THROTTLING CALORIMETER

$$Q = \frac{H_2 + .47(t_s - t_2) - h_1}{L_1}$$

To solve, join P_2, the pressure on the discharge side, with t_s, the temperature on the discharge side. Find the intersection with axis A and join with P_1, the pressure in the steam main. Extend to Q.

Thus the key diagram shows that for $P_2 = 14.7$, $t_s = 270°$, $P_1 = 110$, $Q = .9883$.

A slight and unimportant error is introduced by assuming the specific heat of superheated steam to be constant at .47

The Throttling Calorimeter

PROFESSOR JOHN B. PEDDLE
Acting President Rose Polytechnic Institute

THE accompanying chart for the solution of the formula for the throttling calorimeter seemed to me to need little or no explanation but the Editor of The Technic insists that for a considerable number of readers it will be meaningless without some sort of accompanying description of its purposes.

Charts are very common nowadays for the solution of equations which are in frequent use, and especially if their form is at all complicated.

They are used very much as is the slide rule to avoid the drudgery of calculation. They have moreover the advantage over the slide rule that no thought need be taken about the nature or order of the calculation —the maker of the chart having arranged it so that the proper multiplication, division, addition, subtraction, etc., will take place if the directions provided with the chart are followed. The chart user may be utterly ignorant of the mathematics for solving an equation but by the use of the chart can arrive at the correct answer.

In the better class of modern charts the variables in the equation are plotted on a group of lines—straight or curved—each line being assigned to one variable. The values of the variables which would be substiuted in the equation are found on the graduated scales and these points joined by straight lines according to directions on the chart—the last line drawn passing through the desired result. The formula chosen for the accompanying chart is that for the throttling steam calorimeter

$$Q=\frac{H_2+.47\,(t_s-t_2)-h_1}{L_1}$$

where Q is the quality of the steam H_2 the total heat on the low pressure side of the orifice, t_2 the temperature of the boiling point on the low pressure side, t_s the actual temperature on the low pressure side and h_1 and L_1 the heat of the liquid and latent heat on the high pressure side.

The equation in itself presents no special difficulty but it is a nuisance to have to pick out the various constants from a steam table every time the equation is used, and if many calculations are to be made considerable time is wasted. For convenience in the use of the chart, instead of marking on it the various heats called for by the formula the corresponding pressures are given.

To simplify the construction the assumption has been made that the specific heat for superheated steam is .47 and constant between 10 and 20 pounds absolute pressure. While this is not quite true the resultant error is not of serious importance.

Obsolescence

L. H. Witt, Jr., m. e. '31

WHEN a large industry once advertised that it was in the market for machines of such efficiency as to justify scrapping their old equipment, a mild sensation was created. Here was something new: a manufacturing concern advertising not to sell something, but to buy something. It saw the possibility to make money through buying. This company realized that the continued use of its obsolete machinery was costing more money than it should.

The activities of the various equipment companies in showing the executives of manufacturing concerns how, by the replacement of obsolete machinery and methods, the efficiency and output of their business could be increased. The realization, that production costs can be thus diminished, is causing these executives to become obsolescence-minded.

What is obsolescence? With reference to business, obsolescence denotes the state of equipment and methods that have been rendered out of date by the advent of more efficient equipment. Although the tools may be well maintained and as good as new, the equipment is obsolete if the progress of the art has made available new tools of greater efficiency, and as a result the continued use of the old makes manufacturing costs higher than they need be.

In the mind of every live engineer the question uppermost should be: Is the new method, or new machinery enough better than the old to warrant discarding the old for the new? Then what disposition should be made of the old equipment?

It seems to me that when new, improved methods and machines reduce production costs sufficiently to increase the profit on the investment, the first question of the engineer is solved. But the question of disposing of the still usable equipment remains a serious matter because, although the machinery may be obsolete, the replacing may still depend upon what can be salvaged from the old. Should it be scrapped, traded in, or should it be sold to some minor competitor?

It is evident that the most efficient equipment is always desirable, as it is obvious that the low cost producers set the price. Their market competitors must get into line if they want to stay in business. Therefore, a new company, or an old one who has kept up to date in methods and equipment necessarily has the advantage over its competitors. Here is a big problem for the engineer in charge of the plant.

How Great Is Your Mathematical Power?

MANY people who have studied the higher branches of mathematics do not know much more about the subject than those who have never done so. If you are not sure how much you do know, you may test your knowledge on the following problems. The principles involved should be familiar to every college student.

PROBLEM 1.

Two buildings on opposite sides of an alley, have their walls parallel to each other and perpendicular

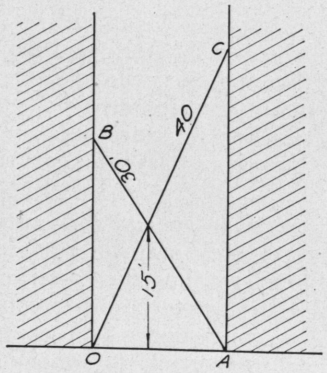


FIGURE 1

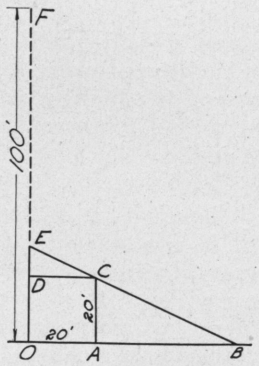


FIGURE 2

to the plane of the alley. A 40 foot ladder is placed with its foot against one building and leaned against the opposite building. A 30 foot ladder is placed with its foot against the other building and leaned against the opposite building. The two ladders cross at a point 15 feet above the alley. How wide is the alley? (Fig. 1 illustrates the position of the ladders).

PROBLEM 2.

Here is an easy problem that anyone should be able to solve.

A flag pole 100 feet high stands 20 feet from a wall which is 20 feet high. During a storm the pole is broken. The upper part falls across the wall and at right angles to it so that when the tip of the pole is on the ground, the member just touches the wall. The two parts do not separate but make an angle with each other as though they were hinged at the point of the break. How far above the ground did the break occur? (Fig. 2 illustrates the initial and final positions of the flag pole.)

PROBLEM 3.

Five men stranded on a desert island, gather cocoanuts for three days, while awaiting rescue. They also acquire a pet monkey. They plan to divide the cocoanuts evenly when they leave the isle. On the third night a ship arrives. One of the five men, becoming suspicious of the others, decides to take his fifth and secrete it. In doing so, he finds the pile divisible by five with one cocoanut remaining. In strict honesty, he gives this odd nut to the monkey and takes away his share.

After this man retires, the second awakens and decides to abscond with his share. Then the other three do the same, consecutively. Each of the five men finds the pile divisible by five, except for one nut which in each case is given to the monkey. That is, each man takes one-fifth of the quantity, minus the one given to the monkey, left by his predecessor after the latter has taken his fifth of the quantity, minus the one given to the monkey, left by his predecessor, etc.

After the fifth man has taken his portion and given the monkey one, the number of cocoanuts then remaining in the pile is evenly divisible by five. How many cocoanuts were there in the original pile gathered althogether by the five men in the three days?

A solution to each of these problems will appear in the November issue.

The Refining of Crude Petroleum

(Continued from page 7)

using 1¼" screenings, and equipped with automatic stokers. In addition there is one boiler installed to use powdered coal. The powdered coal installation consists of a Ball mill supplying from 95 to 100 tons of coal per day, situated on the floor directly under the boiler room. It is a cylinder approximately five feet in diameter and fifteen feet long, placed in a horizontal position. As the machine rotates air is forced through by means of a centrifugal fan. The rotation and the draft combined tend to break up the coal bed of the furnace. A preliminary test showed that eight and one-half pounds of steam may be realized per pound of coal. The test further indicated a 15 percent CO_2 value.

The turbine room is provided with the most modern appliances. Briefly, the equipment is two Westinghouse turbo-generators of 1250 KVA rating, requiring 480 volts, 1502 amperes, with a power factor of .80, and having a speed of 3700 R. P. M. It is of interest to note that the turbines are of welded joint construction throughout, there being no evidence of a flange anywhere. Tests show that at 2500 pounds pressure the welded joints revealed no signs of undue strain. The turbines have a back pressure of 2 pound gauge and bleed at 115 pounds. The turbine room is equipped with twelve panel switch boards, each panel of which represents a separate circuit for some particular part of the refining process.

This completes the entire process. This article is necessarily descriptive for the most part. The purpose has been to give a clear idea of all the methods and to relate the way in which the various fractions are taken out and the process through which each fraction passes before becoming the finished marketable product.

This and the hundreds of other refineries of the same nature, are supplying a great American need. To produce a better grade of gasoline is the constant aim, and surely with the efficient methods now employed, this purpose is being carried out, making oil refining one of America's greatest industries.

Maurice C. Rypinski '97

ROSE Polytechnic Institute claims many graduates who have risen high in the industrial world. These men have frequently been pioneers in their particular fields. Just such a man is Maurice Charles Rypinski of the class of 1897. His life has been closely associated with the development of the radio industry, which, although comparatively young, has had a growth more remarkable than that of the automotive industry.

Mr. Rypinski entered the Institute from Bryan, Texas, at the age of 16. He received his Bachelor of Science degree in Electrical Engineering in 1897. For some years after graduation he served various companies, obtaining a wide variety of experience that was to prove invaluable to him in later years.

From 1897 to 1902 Mr. Rypinski was engineer with the General Electric Company at Schenectady, New York. For the next two years he was superintendent of factory of the Empire Electrical Instrument Company, New York City, and was president of the Simplex Company of Newark, N. J., from 1904 to 1906. These two positions gave him an intimate view of both the production and executive ends of business.

MAURICE C. RYPINSKI

After disposing of his interest in the Simplex Company in 1906, he went with the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pennsylvania, as Instrument Engineer in the Supply Division. In 1908 he was transferred to the Sales Department of the New York Office, and in 1909 was made Manager of the Supply Division of that office. In 1915 he was transferred to East Pittsburgh as manager of the Meter Section, Supply Department, and the following year his duties were enlarged to embrace the management of the Transformer Section of this Department. Shortly afterwards, he was advanced to assistant to the manager of the Supply Department in which position he was not only responsible for the meter and transformer sections, but also for a number of other important sections of the Supply Department. In this position, also, he had certain general responsibilities, among which was the development of new lines of products.

About this time the United States entered the World War, and Mr. Rypinski spent a great deal of time in Washington, assisting the Government in preparing specifications on the war necessities with which his experience had made him familiar, and also in securing for the Westinghouse Company items to be manufactured in plants normally devoted to peace time products. In this way he first became identified with radio, and after the conclusion of the war, he was one of those mainly responsible for the Westinghouse Company taking up the manufacture of radio as a peace time product, and particularly for the initiation of organized broadcasting from Westinghouse Station KDKA during the fall of 1920 and the spring of 1921, which marked the beginning of the development of radio broadcasting as we know it today in this country. Mr. Rypinski was at that time placed in charge of its radio business by the Westinghouse Company, and was later made Manager of the Radio Department.

In 1922 he purchased an interest in C. Brandes, Inc., of New York City, makers of radio headphones, and left the Westinghouse Company to devote his attention to that venture. The business grew very rapidly until the Company was operating factories in Canada and England, as well as in the United States, and in 1926 it was merged with the Federal Telegraph Company of California, one of the pioneers in the industry, and commenced the manufacture of Kolster radio sets under a holding company known as Federal-Brandes, Inc. In 1928 the name of this holding company was changed to Kolster Radio Corporation.

In the spring of 1929, Mr. Rypinski withdrew from active duties in order to devote more time to his personal affairs, and has opened offices in the Griffith building in Newark, N. J. He is, however, still vice-president and director of Kolster Radio Corporation and its affiliated interests, as well as a director in other companies.

Mr. Rypinski has always manifested a close interest in industrial association activities, and has helped to organize a number of associations in the electrical and radio industry. He has served as a member of the board of governors of the National Electric Manufacturers Association, and has been active in the National Electric Light Association, Institute of Radio Engineers, and American Institute of Electrical Engineers.

It is interesting to note that his experience has covered every field of industrial activity, including engineering, production, sales, research and development, patent and other legal activities, as well as administrative duties in general. In his work as an engineer he has taken out approximately fifty patents.

Ideals are like stars; you will not succeed in touching them with your hands, but like the seafaring man on the desert of waters, you choose them as your guides, and, following them, you reach your destiny.—Carl Schurz.

Research and Progress

Conducted by Lee C. Kelsey.

Steamship Bremen

GERMANY'S big new passenger liner Bremen, recently crossed 3,196 miles of water at the rate of 29.6 knots or 34 land miles per hour, thus demonstrating what science and inventive genius have done for the purpose of modern transportation. For the purpose of securing speed, the Bremen was built with a bulb stem and a hull so moulded as to push the water down rather than to one side, thus avoiding the waves created by most ships which retard their progress. Air resistance has been reduced to a minimum by making the vessel unusually low and close to the water for her tonnage. The two funnels are low and squat, though the Bremen is propelled by steam turbines.

The liner has a tonnage of 46,000 tons and is 920 feet from stem to stern. It will carry 2,000 passengers with a crew of 950 men and officers aboard, with all conveniences for them. It is equipped with the latest design in power, speed and comfort; private baths, radio communication, iceberg detectors and turbine driven screws. Thirty engines are used to propell the ship. These engines consist of low, medium and high pressure turbines and are located in two separate rooms. They furnish the driving power for the four seventeen-ton bronze propellers. Thirty-two thousand tons of salt water per hour are used as a cooling system for the engines. The power plant is large enough to supply power to light a city of 75,000 people. Signal bells and telephones are distributed in 10,000 points about the ship.

On board is an operating room, dental office and other facilities for supplying all medical or surgical needs of the passengers. There is a swimming pool, the water in which is kept at a constant temperature and is chemically treated to keep it absolutely pure at all times. A gymnasium, indoor golf course, bowling alleys and tennis courts also add to the recreational comforts of the passengers.

The Bremen is a floating city, with every modern convenience of a home and is the last word in mechanical design and power for a passenger liner on the high seas.

Surface Hardening of Steel by Nitrogen

IT is largely to the metallurgist that the construction engineer gives credit for the new materials used in the machinery of our modern manufacturing plants, where there is a growing demand for machines of greater speed, necessitating materials to withstand higher temperatures, greater stresses, superior wearing qualities.

One of the most recent contributions has been a method of hardening steel by nitrogen instead of carbon. Germany has developed a process called nitriding, in which steel is treated with ammonia. With the addition of aluminum, chromium and other like metals to the steel to be hardened, there is obtained a great increase in the depth of the hardened surface. This process requires a temperature of approximately 950 degrees F. maintained about 90 hours. Many articles of aluminum-chromium steels, so difficult to make and machine, were hardened satisfactorily, resulting in giving this new art of nitriding considerable publicity. At the present time, the greatest need is special steel to be treated. Much experimenting is going on and the metallurgists of both Europe and America are searching for the steels most satisfactory and suitable for the nitriding process. Aluminum is an important element in the new steel and molybdenum is used to advantage, since it tends to improve the toughness of the finished product.

Nitriding should give the steel a light silvery gray finish and be absolutely file hard. The under surface of the steel will also be quite hard. If the under surface is soft it is evident that the hydrogen used in the furnace has been more active than the nitrogen, and that there was not enough circulation of the ammonia in the furnace. The surface should be very hard and able to withstand heavy blows.

The nitriding process will cause a reduction in diameter of a shaft of 0.001 and will be quite uniform. This is an advantage as many intricate machine parts can be made with little or no distortion. Most of the work done so far has been experimenting with nitriding. Experimental tests are being made on pump shafts, valve seats to withtstand pressure and temperature, airplane engine timing gears, and hundreds of other machine parts and appliances. To parts where corrosion plays a part the new steel is very satisfactory and economically employed since it has to compete only with stainless steel.—*Abstract Mining Engineer.*

Asphalt Emulsion

RESEARCH in the chemical laboratories has brought forth many new materials, among which is asphalt emulsion, prepared from the pure asphalt. To produce it requires no heating, the material being merely allowed to lose its water by evaporation. The emulsion resists weather better than the pure asphalt, is very ductile and resists heat to a high degree.

Pure asphalt is very dangerous to use as there is always the fire hazard and a certain risk of injury to the workmen. When applied as a solvent, fumes arise, the surface must be free from moisture and a thick coat cannot be put on. After being emulsified the asphalt can be used in water, in fine particles, upon which the agent used in emulsifying is absorbed as a protective layer. This agent is a selected clay-like substance.

The emulsion can be readily shipped in drums and needs only to be mixed with cement, acids, salts and other constituents to make it suitable to be used for different applications, as a spray, dip, mold, etc.

Once the emulsion has lost its water through evaporation it will not re-emulsify. It will readily adhere to cement, wood, and wet surfaces.

Emulsions made from slow melting point asphalt have been coated on metal surfaces and exposed to the elements over long periods and show no effect of flow or weathering. Due to its inertness to flow and its peculiar structure the emulsion is more durable and weather-resistant than pure asphalt. This has led to the water-proofing of wood, roofing, and cloth for bags, and is very effective as a water-proof coat over heat insulators when applied over magnesia and a cork covering. The emulsion can be used as a cement for rubber and composition tile, insulating board and other similar materials.

One of the best uses for the emulsion is as a binder in mastic flooring. Mixed with sand and Portland cement, it is adaptable for flooring in factories, railroad cars, ship decks, loading platforms and trucking aisles. It requires hardening only about forty-eight hours, after which it is ready for heavy traffic. The paper industry uses the emulsion in its waterproof paper. It is either mixed in the paper or used as a filler between two layers of paper. However, the most important use is as a protective coating for wood, iron, structural steel and pipe lines for water, oil and gas. It is used to combat the corrosive soil conditions. The low cost and ease of application has led to its extensive use in the west for coating oil and gas pipe lines.—*Abstract Chemical Engineer.*

Dust Hazards

THE hazard of dust explosion exists in approximately 28,000 of the industrial plants of the United States, which employ more than 1,324,000 people and produce more than $10,000,000,000 worth of products a year, and these plants should take precautions to eliminate it, said David J. Price, principal engineer of the chemical engineering division of the Bureau of Chemistry and Soils, U. S. Department of Agriculture, in an address today (Sept. 20) before the Northwest Fire School, at the University of Minnesota. The school is being attended by firemen of the Northwest.

Recalling a dust explosion which occurred in 1878 in a flour mill in Minneapolis and took the lives of eighteen men, Mr. Price told of the progress that has been made in methods of preventing dust explosions and particularly of the studies and experiments made by the Bureau of Chemistry and Soils which have had an appreciable effect in reducing fire losses from dust explosions in industrial plants.

A recent survey by engineers of the Department of Agriculture, in which 97 dust exposions were studied in 15 different lines of industries exclusive of the grain industries, disclosed that dust explosions are occurring in new lines of industry in which, on account of increase in production, utilization of by-products, and introduction of new manufacturing processes, the creation of more dust and the bringing about of additional explosion hazards have resulted.

"Although many dust explosions occur during the normal operation of the plant, there have been a number of disastrous explosions which took place during fire fighting," said Mr. Price. He classified these explosions as follows: Those which have taken place when firemen attempted to remove the contents of bins or other inclosures, materials which usually are in powdered form and readily ignite; explosions which may be called the exposure hazard of firemen and occur some time after the fire starts as a result of the falling of a floor or the dropping of bottoms of bins, which forces a dust cloud into the fire; and explosions which have followed the use of a heavy stream of water, which, when striking a pile of powdered material, forces the dust into the flames. There is still another type of explosion which results when the application of water to some kinds of dust causes the formation of explosive gases by chemical reaction, said Mr. Price, citing serious results which have followed the putting of water on hot aluminum powder and the resultant generation of hydrogen gas, which is highly explosive under certain conditions.

The engineer advised the firemen to systematically inspect industrial plants so as to know the peculiarities of construction and the location of explosion hazards, to thoroughly wet down the contents of bind of possibly explosive material before moving the material from the bins, and to use spray nozzles instead of heavy streams on piles of materials which may hold the explosion hazard.

Deterioration of Time Study

WHEN time study has sunk so low that any clerk can do it and use it exclusively for purposes of rate setting, it is time to call a halt. Time study has a higher purpose. It is only one of the tools by which better production management is achieved. Even so, it should be in the hands of mature men who have had an opportunity to become intelligent about human relations.

Piece rates or bonus rates, either for individuals or groups, are important. For this reason they should be set with infinite care, rather than casually as they are set in altogether too many plants today. But before piece or bonus rates must come something else if permanent results are to be achieved. The plant should be put in order. Production scheduling should be organized, work should flow evenly. Time studies in the hands of competent men can do much to achieve these ends and thereby eliminate waste before rates are thought of.

In this way, piece rates and bonus systems will not become a substitute for good management. They will be genuine tools of management, putting the responsibility for each step where it properly belongs. Time studies can then be carried on effectively, not to change rates continuously, but in connection with all manner of research, to find more efficient equipment and methods of manufacture.—*From Factory and Industrial Management.*

Published Monthly by the Students of the Rose Polytechnic Institute

The Rose TECHNIC

A Magazine Pertaining to Engineering and Allied Sciences

Member of Engineering College Magazines Associated

Franklin 7—Rose 0

IN the initial contest of the year Rose was defeated by Franklin 7 to 0. It was a hard-fought game throughout and a tough one to lose. Rose seemed to be the superior team, making more first downs than Franklin, but the offense did not seem to function right. On defense Rose was invincible, throwing the Franklin backs for many losses. Franklin's score came late in the second quarter when one of their tackles intercepted a Rose pass and ran 50 years for a touchdown.

The Rose line held the advantage over Franklin's but the Franklin backfield was much heavier than that of Rose. Virt of Franklin easily outkicked Dean and Adams of Rose.

Dean, Kruzan, Tonetti, and Hill were the bright lights for Rose and Surface, Virt, and Wooden played the best game for Franklin.

Line-up and summary:

Franklin (7)		Rose Poly (0)
Languell	L.E.	Gillette
Combs	L.G.	Pratt
Burgett	L.G.	Bruce
Duggan	C.	Ogan
Root	R.G.	Tonetti
Norris	R.T.	Kruzan
Simms	R.E.	Hylton
Surface	Q.B.	Hill
Wooden	L.H.	Smith
Hiernaux	R.H.	Dean
Virt	F.B.	Eldred

Score by periods:

Franklin	0	7	0	0	—7
Rose Poly	0	0	0	0	—0

Scoring—Touchdowns: Franklin, Mays. Points from try after touchdown: Franklin, Virt.

Substitutions—Franklin: Downey, Rohrabaugh, Green, Taylor, Cain, Mays, J. Williams, L. Brown. Rose Poly: Dicks, Adams, Byrnes, Menden, Creedon, Nichols, Lowthers, Evans.

Officials—Referee, Dick Miller; umpire, Dietrich; head linesman, Seidensticker.

THE prospects for a winning football team at Rose are much brighter this year than they have been for several years. With nine letter men back and some excellent material from the freshman class, this year should mark the turning point in Rose athletics.

The letter men back are Ogan, Tonetti, Bruce, Evans, O'Mara, Dean, Smith, Adams, and Eldred.

The outstanding freshmen who are out are Leitzman, who made the Tribune all-valley last year while at Martinsville; Kruzan, who made second all-valley at Wiley; Gillette, ex-captain of Logansport; Hylton, an outstanding end from Garfield; Reinking and Simpcoe, both letter men from Garfield; Creedon from Wiley; Lowther from Robinson, and Nichols who played at Garfield two years ago. Menden, who played on the freshman team three years ago, is back and is making a strong bid for a tackle position.

One of the most important games of the season comes October 19 when Rose stacks up against Hanover at Rose Field. The two teams are bitter rivals and have met on the gridiron for many years. This game will be Homecoming for Rose and many old grads are expected back.

The 1929 Rose schedule is as follows:

Sept. 28—Franklin at Franklin.
Oct. 5—Earlham at Richmond.
Oct. 12—Evansville at Rose Field.
Oct. 19—Hanover at Rose Field.
Oct. 26—Indiana Central at Indianapolis.
Nov. 2—Oakland City at Oakland City.
Nov. 9—Danville Normal at Rose Field.
Nov. 23—Indiana State at Terre Haute Stadium.

The New Year at Rose

Chester C. Stock, ch., '32

THE new year at Rose brings with it quite a few noteworthy changes. The senior class, of course, graduated and a new freshman class has entered, which is one of the largest to enter in recent years.

We find, too, that the Faculty has changed this year to a much larger extent than usual. This year we find Mr. John L. Bloxsome teaching history and English in place of Mr. Halstead. Mr. Bloxsome graduated from DePauw in 1927 and from that time until this fall has been head of the English department of the Alexandria high school, Alexandria, Indiana.

Mr. Raymond G. Hieber is now assistant professor of physics and electrical engineering. Mr. Mason, who formerly taught in this capacity, has gone to a position in the engineering department of the Southwestern Louisiana Institute. Mr. Hieber received his B. S. degree from the University of Dayton in 1922 and his M. S. degree from Ohio State University in 1924. He was also in the Radio Research section of Wilbur Wright Field from 1922 to 1923. From 1924 to 1926 Mr. Hieber was instructor of physics and mathematics at the University of Dayton. Before coming to Rose he was assistant professor of mathematical physics for three years at St. Louis University.

Prof. Childs has taken a leave of absence and is studying in Europe. To fill the vacancy left by him and to further distribute the work in the chemistry department, Mr. H. C. Koch and Mr. R. C. Kintner have been elected. Mr. Harold Koch, instructor in chemistry, received his B. S. degree in 1925 from Tri-State College at Angola, Indiana. In 1927 from Oklahoma Agricultural and Mechanical College at Stillwater, he received his M. S. degree. From 1927 to 1929 Mr. Koch was at the University of Wisconsin teaching and doing graduate work.

Mr. R. C. Kitner, assistant professor of chemistry, received his B. S. degree from Ohio State university in 1923 and in 1929 his M. S. degree from the same school. Following his graduation he spent three years in charge of several various chemical plants. A year and a half he spent in teaching engineering and industrial chemistry at Ohio State.

To the Civil department, a Rose graduate has returned. Mr. Harve N. Chinn, now instructor in civil engineering, received his B. S. degree from Rose in 1923. He has had practical experience on the Indiana State highway commission and with a construction company. He has been in the city engineer's office at Hammond, Indiana, for four years. Mr. Chinn is a member of Tau Beta Phi.

While not members of the Faculty there are two other offices filled by new persons. Miss Mary E. King is now full time assistant librarian. Miss King received her A. B. from Indiana State Teachers' College and her B. S. degree from the University of Illinois. Miss King will take the place of Miss Edna Neukom, who is now the wife of Prof. Foresman of Purdue. It will be remembered that Prof. Foresman taught last year while Dr. White was ill.

Miss Helen E. Mahley is the new secretary to the president. Miss Mahley had been Girl Reserve secretary at the Y. W. C. A. for about two years. She is a graduate of Wellesley. Miss Mahley takes the place left vacant by Mrs. Barbara Goodale.

To all the new students, faculty members and the ladies we extend a hearty welcome to Rose. May you regard old Rose with as much affection as the rest of us.

* * * * *

We have also something to say about the buildings when speaking of the coming year at Rose. All students returning to Rose this fall must have been surprised at what they saw. And they certainly had reason to be, for the school has spent a fairly large sum of money since last June, making changes and additions. But this money may be considered well spent, for much favorable comment upon the improvements has been heard from the student body and the Faculty.

Driving up to the school we see near the road on each side of the school two very attractive signs, each bearing the name of the school. These were placed last June, an answer to a long felt need. Then along the drives we notice boulevard lights. These have just been placed, and when lighted should make the campus more attractive at night.

In discussing the new arrangement in the front section the main building it is hard to decide just where best to start. We find that the former Y. M. C. A. room is now room A. The former room A with the east end of the east locker corridor has been made into a library reading room. The book stacks are now where the Technic office and the reading room formerly were. The Y. M. C. A. now has the half of the space formerly occupied by the book stacks which adjoins the main floor corridor. The other half is made into a classroom for drawing classes. It will be possible to darken this room to project illustrations and lantern slides. Part of the east locker corridor has been converted into a library workroom and a janitor's store-room. The remainder is a hall leading to the library reading room. The Technic office is above the dark room, opening upon the mezzanine corridor.

Going on back through the building we find that the east civil office partitions have been extended upward. Back in the electrical laboratory we find the eyesore that blocked the corridor has been removed. The apparatus has been inclosed in a special room at one side. In the chemical laboratory there is a small storeroom in the southteast corner. The northeast alcove has been partitioned off from the rest of the laboratory. It will probably be a room in which the balances are kept.

Outside in the rear we find new concrete steps to the athletic field, and a new bridge of more substan-

(Continued on page 20)

'07

Mr. W. W. Kelley, '07, was appointed Chief Engineer, September 1, 1929, of the Atchison, Topeka and Santa Fe Railway Company with offices at Amarillo, Texas. Mr. Kelly was formerly District Engineer with the same company.

'10

James A. Shepard, '10, has taken a position as Assistant General Manager of the Roan Antelope Copper Mines, Limited, at Luanshya, Northern Rodesia. The company is beginning the erection of a large plant and is expected to be one of the world's greatest copper producers in a few years. Mr. Shepard sailed on August 23 from New York.

'16

F. Casper Wagner, '16, has been promoted to Chief Engineer of the Central Power and Light Co. of Texas, with offices at Corpus Christi. He was transferred from Victoria where he was Dispatcher.

'17

James L. Weeks, '17, Combustion Engineer, Wilson and Company., Chicago, has accepted a position as Mechanical Engineer with the City Water Department, Chicago.

'18

Andrew Yatsko, '18, formerly of Terre Haute, has been promoted from Induction Motor Engineer to general superintendent of the General Electric works at Oakland, Calif.

'20

Kenneth Huston, '20, has returned to Edgewood Arsenal, Md., where he is assistant to the technical directors.

Clift Young, '20, entered the New Jersey Law School at Newark, September, 1929.

Rex J. Self, '20, has recently been promoted to Assistant Superintendent of the Chester Refinery, Chester, Pa., of the Sinclair Oil Co., with which he has been connected since his graduation.

'25

Frederick L. Mattson Jr., '25, recently passed the government civil service examinations and was given a position with the Interstate Commerce Commission at Washington, D. C. Since his graduation he has been with F. L. Matteson and Son, contractors, except for one year, when he was with the Lincoln Oil company as architectural engineer.

Zachary X. Bennett, '25, is with the Vincennes (Ind.) Bridge Company.

C. Derby McDargh, '25, formerly Appraisal Engineer, Toombs and Daily Mortgage and Bond Co., Chicago, is now with the Portland Cement Association Research laboratories. He is Assistant Engineer with offices in Chicago.

'26

Max Sherwood, '26, has taken a position with the International Paper Co., Temiskaming, Province of Quebec, Canada.

'27

Baird West, '27, has taken a position with the Engineering News-Record. He is Assistant Director of Market Surveys and Construction Methods.

'28

J. Rex Adams, '28, received his master's degree from Carnegie Tech in June, 1929. He has also been awarded a Mellon Institute Fellowship for the next year. This award is one of the highest honors in chemistry. His work will be in high pressure organic synthesis dealing with motor fuels.

'29

Andrews, Fred O., student engineer, Illinois Bell Telephone Co., Chicago.

Bailey, Ralph C., student engineer, Ohio Bell Telephone Co., Cleveland.

Baker, Albert E., telegraph and signal department, N. Y. division Penn. R. R., Trenton, N. J.

Bell, Theron S., student engineer, General Electric Co., Ft. Wayne, Ind.

Brosman, Granville P., student engineer, Illinois Bell Telephone Co., Chicago.

Cooley, John C., Kimberly-Clark Corp., Neenah, Wis.

Derry, John A., student engineer, Ohio Bell Telephone Co., Cleveland.

Dicks, A. Wayne, student engineer, Michigan Bell Telephone Co., Detroit, Mich.

Dodson, Wayne E., student engineer, General Electric Co., Ft. Wayne, Ind.

Dowen, Robert H., student engineer, Detroit Edison Co., Detroit, Mich.

Glazner, Kermit H., mechanical engineer, Langley Field, Virginia.

Hadley, George E., Louisville, Ky.

Harris, Raymond P., Cement Co., Chicago, Ill.

Holmes, W. Hugh, International Steel & Iron Co., Evansville, Ind.

Hutchinson, Volney A., assistant engineer, Western Electric Co., Chicago, Ill.

Hylton, Herschel E., student engineer, Colorado Public Service Co., Denver.

Johonnott, E. Sheldon, with Condron & Post, Chicago, Ill.

Knott, Gilbert R., with Illinois Public Service Co., Chicago, Ill.

Krockenberger, Emil A., with International Motor Co., Allentown, Pa.

Lawyer, James, Northern Ind. Public Service Co.

(Continued on page 22)

FRATERNITIES

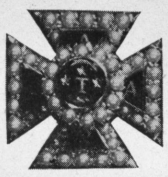
ALPHA CHI SIGMA

THE annual call to school this year reached from St. Louis, Mo., to Charleston, W. Va., for members of Alpha Chi Sigma. Though early in the school year, much activity is being shown at meetings. The most important question is that of a house. Plans are now complete for a temporary house, to be occupied very soon. This will be the realization of a dream long held by members of Iota.

A series of professional meetings are planned for this and next term and we are preparing to make them as interesting as possible.

ALPHA TAU OMEGA

INDIANA Gamma Gamma takes great pleasure in announcing the pledging on September 20, 1929, of Frederick J. Bogardus of Terre Haute.



Brother Stimson was our delegate to the Alpha Tau Omega Congress, held in Los Angeles, last June. He has given us a very interesting and instructive account of his trip and his stay in Los Angeles, including many side-trips to various points of interest. One of the important acts of the Congress was the abolition of "Hell Week" in Alpha Tau Omega.

Many of our Brothers have held positions of importance during the past summer. Brother Ehrenhardt spent three months in the training school of General Electric in Schnectady. This is a very creditable record for an undergraduate. Brothers Allen and Evans were with the Northern Indiana Public Service company, in Hammond. Brother Kenneth Alexander was with the Pennsylvania Railroad company, and Brother John Rockwood with the Big Four, both in Terre Haute. Brother Nicholson was in Indianapolis, working for the State Highway Commission. Brother Trueb was with the Ohio Public Service Commission, and Brother Kessler was with the A. T. & T. Co. at Cleveland, Ohio.

Several members of the chapter are out for football, all of whom are doing well. They are Brothers Evans, Bruce, John Rockwood, Pratt, Broadhurst, Adams, and Trueb. Warren Rockwood and Pledge Brother Bogardus have been serving as assistant managers.

The Chapter held an Open House on Sunday, September 29, 1929. A former custom of serving refreshments was revived. Cider and doughnuts were served to all. Dancing and cards were enjoyed throughout the evening. Another Open House is planned for November 2. This will be in the form of a Hallowe'en celebration.

Our Chapter again led the Greek letter men in scholastic standing for Spring of 1929. The Brothers seem to be studying hard this Fall, and we hope to be high in the ranks of the studious this semester. Nine Alpha Taus have scholarships for the coming year.

Pledge Brothers Clifford Lamb, Claud Wilcox, and Ray Kasameyer are again enrolled in the Institute.

We have recently enjoyed the visits of several alumni. Brothers George Hadley, Frank Swearington, and Nelson Shepherd have been with us, and we hope that they and other alumni will soon return.

During the Summer two of our alumni and one active have joined the ranks of the married. They are Brothers Carmack and Drompp of the class of 1928, and Brother Wilson Storer.

SIGMA NU

AT the opening of school, the brothers returned to the chapter full of pep and enthusiasm, and eager to carry on for Sigma Nu in spite of the loss of eight men by graduation. These graduates are now scattered from Chicago to Washington, trying to make a name for themselves and Rose in various branches of endeavor, and the chapter is confident of their success.

The brothers who returned to the fold, and on whom the fortunes of the chapter will depend this year are: Charles Barbre, Milo Dean, James Brevoort, Glenn Sampson, Hillard Gehres, Floyd Hill, Marvin Wilson, Robert Roach, Albert Ogan, Gordon Carmichael, John Richardson, James C. Weddle, Frank Byrne, Collins Grubb, Wilton Brown, Frank Butler, Myron Clark, Robert Finfrock, Frank Howard, Owen Howson, Lee Kelsey, Jack Sousley, and William Kingler.

Beta Upsilon is pleased to announce the pledging of Harold Amacher, of Terre Haute, George Maurer of Brazil, and Glenn Clark of Worthington, Ind. All three were at Rose last fall but were not enrolled during the spring term.

The school year for the fraternity was officially closed last June with a very successful Senior farewell dance at the Edgewood Cabin on June 7, the last day of final exam. week. Joy and pep reigned supreme as the brothers danced away their last thoughts of school.

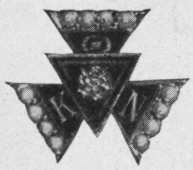
Brother Dean and his social committee are already laying plans for the first dance of the season to take place within the next two weeks. Something new

and different in the way of programs and decorations is promised.

Brother John I. Mendenhall was home on vacation recently and sat in on our first regular meeting. Johnny is with the J. I. Du Pont De Nemours Co. at Wilmington, Del. Other alumni who have visited the chapter this fall are Brothers Valentine Mitch, Hilton Cripe, Robert Wade, Kenneth Wade, Robert Marquis, Robert Thompson, Galen Clark, Wallace Todd, John Cooley, Frank DeWitt, Carl Dowen, and Hugh Holmes.

THETA KAPPA NU

THE opening of school this year found all the brothers back with the exception of Procter, Houston and the seniors who graduated last June.



While we greatly miss those who are gone, the enthusiasm shown by the other brothers is high enough to overcome the loss and insure us of a successful year. Most of the brothers had very interesting work this past summer but were glad to get back again. In answer to the first roll call we find Don Henderson, Mick Kehoe, Charlie Lo'ze, Pete Scofield, Butch Piker, and Paul Baker back for their last year as seniors. The junior ranks found Stan Davis, Harold Powell, Harry Netzhammer, Frank Sabla, Wayne Dickerson, Joe Earl, Dick Johnson, Charlie White, Don Greenfield, and Andy Spence, while Henry Pfizenmeyer, Paul Froeb, Al Ahlers, Wendell Templeton, Orville Potter, Bill Shofner, Jim Hughes, Chet Stock, and Bill Haynes will uphold the dignity of the sophomores.

During the past year two of our brothers have joined the ranks of benedicts. William Hillis and Mary Kendall Whitley were united in marriage July 27th, 1929, and are at home in Cincinnati, Ohio. Brother Hillis is connected with the Big Four railroad. The marriage of Allen Reeves and Emma Lou Furgeson took place last April. He surely pulled a fast one on us as we knew nothing of this until school was out. Brother Reeves is connected with The Diamond Chain Co. of Indianapolis. Indiana Gamma extends its best wishes to these two couples.

Brother York was a recent visitor at the house and says things are going fine in Indianapolis and that plans are now under way to put over our first State Dance. Brothers Kehoe, Babillis and Witty were back for a few weeks from Schenectady. This is their first visit since leaving school and we were surely glad to see them. Brother Beem who is now attending General Motors Tech at Flint, Mich., was back for a few days. Certainly seemed like old times to have him around.

The social program for the year has been tentatively planned including a fall dance, a Christmas dance, and a State Dance in the spring. Besides these, several house parties will be held and are always welcomed by the brothers.

We are making arrangements to do our share in putting the Homecoming over this year on Oct. 19th. Hanover will be a worthy opponent and we intend to back the team to the last man, win or lose. We are not overlooking the Normal game either, so come on, fellows, let's uphold the old name of "*The Fighting Engineers.*"

KAPPA OF THETA XI

KAPPA of Theta Xi has started the new year out with a bang. We have all but one of last year's men back, ready to do big things and in addition we have a few returned from previous years. All the fellows seem to be glad to get back in school after a summer of "hard work." We note with approval the great improvement that has taken place around the campus and in the buildings, and feel sure it will tend to help us in our work.

Brothers Wells, Schaal, Davy, and Barrett are out for football, so we have hopes of landing someone on the varsity. With the apparent wealth of material from local high schools, and Rose letter men who have returned, it looks as if this would be a fairly successful year for Rose on the athletic field. At least, let us hope so! Theta Xi will do its best to support Rose both on the field and from the sidelines.

Our chapter is looking forward with great expectations to our first dance which will be a "hard-times" dance about Hallowe'en. This is one of the big events of the year, and many of the old boys come back for it. Brothers Wells and Renfro are already at work on plans for the dance. Also plans are being made by Brother Davy for frequent house parties on Sunday afternoons.

In conjunction with the graduation exercises last June Kappa held their triennial reunion. Starting with a stag banquet at the Terre Haute House on Thursday night and ending with a dance at the Terre Haute House on Saturday night, the whole affair was a huge success. The brothers that came seemed to enjoy themselves, and it really showed them that Theta Xi is on the Rose Poly map in headline type.

Almost immediately after the reunion we were surprised to hear of the marriage of Brother Crawford to Miss Elizabeth Davis of this city. We are extremely sorry to lose Brother Crawford, but wish him the greatest success in his new venture.

Man (at door of sorority house): "Is May in?"

Beautiful (but dumb) Pledge: "May who?"

"Man (becoming exasperated): "Why, May O'Naise, of course."

Beautiful (but dumb) Pledge: "Sorry, but May O'Naise is dressing."

The New Year at Rose

(Continued from page 15)

tial materials across the creek. Strolling over to the "dorm" for lunch we are pleased at the finished appearance that comes from the new walks, steps, terracing, and gutters that have been laid.

Such a list of improvements speaks well for those who have the affairs of Rose under their guidance. If such a progressive program is followed for future years, we are sure that the Rose campus will be known for its beauty, and compare favorably with the campus of any other school.

* * * * *

Speaking of progress and improvements brings to mind a suggestion which has been heard from several students. The name of the school should be painted on the roof of the school. The roof is of such a nature that it readily adapts itself to this purpose. People riding the Pennsylvania trains can read the name from the smoke-stack. The new signs in front serve to tell those riding autos on the National road. But we have nothing to tell those who travel in the most modern way. Not only should such a roof sign be helpful to aviators, but the advertisement or publicity value would be great. For Rose is situated on U. S. highway No. 40 along which pilots find it convenient to fly. The T. A. T. planes pass over the Institute every day, carrying people of note and influence who could do much to make Rose known to the world.

And while on the subject of aviation we think there should be worked into the curriculum courses on aviation. At first only a very elementary course could be taught, but later, to keep in step with the times, all branches of aviation engineering such as the designing of planes and motors could be taught. The testing of various materials and fuels should be carried on with the finding of new and perhaps revolutionary methods and processes. The construction of airports, radio compasses, and beacons offers a wide field. The whole field of aviation is as we all know, comparatively new and is attracting students in ever-increasing numbers.

DORM DOINGS

THE fellows living at the "dorm" have formed an organization. They elected for their officers: Bob Mees, Columbus, Ohio, president; Herndon Witt, Louisville, Ky., vice-president; Raymond Wells, Nelson, Mo., secretary-treasurer. Last year's constitution has been adopted for this year. A social committee, consisting of Hillard Gehres, Neal Gilbert, and Raymond Wells, has been appointed for the purpose of planning dances and other social activities. There will also be an entertainment committee for the purpose of obtaining speakers and other entertainment for the weekly meetings.

The dormitory is again well filled and continues under the capable management of Mr. and Mrs. F. H. Hopkins. The cafeteria is maintaining its high standard and is better patronized than ever before.

(Continued on page 26)

Alumni Notes

(Continued from page 16)

Moench, Herman A., research assistant, Bell Telephone Laboratories, New York, N. Y.

Nancrede, Henry T., estimating department, Byllesby Engineer Corp'n., Chicago.

Plock, Carl R., Logan Co., Chicago, Ill.

Porter, Albert N., with Wapakoneta Machine Co., Wapakoneta, Ohio.

Reeves, Allen W., with Diamond Chain Co., Indianapolis, Ind.

Scharf, Carl W., research assistant, Bell Telephone Laboratories, New York, N. Y.

Schatz, Harld F. L.

Silverstein, Abe, mechanical engineer, Langley Field, Virginia.

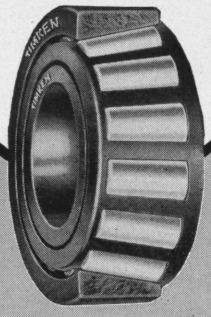
Stewart, Lafayette, with Indiana State Highway Commission, Knightstown, Ind.

Tapy, Francis E., cadet engineer, Detroit Edison Co., Detroit, Mich.

Thompson, David L., with U. S. Gypsum Co., Detroit, Mich.

White, Max S., student engineer, General Electric Co., Ft. Wayne, Ind.

Vendel, J. Robert Jr., civil engineer, Interstate Commerce Commission, Washington, D. C.



TIMKEN BEARING EQUIPPED

an economic force pitted against waste —*wherever wheels and shafts turn*

A BASIC idea thirty years ago, "Timken Bearing Equipped" is today an economic force pitted against Waste—typifying a huge replacement program which sweeps all before it.

Student engineers will be the future leaders in the industrial war on Waste. To them will fall the responsibility of carrying on the work which has been so well begun—and "Timken Bearing Equipped" will be then, as it is now, the most powerful weapon available.

For Industry, Agriculture, Mining, Transportation... find in Timken *the one bearing that does all things well,* whether the loads are all *radial,* all *thrust or a combination of both.*

Frictional power loss and wear are reduced to the vanishing point; lubrication costs become negligible; machine life is extended; maintenance costs are cut to the bone.

And the exclusive combination of Timken tapered construction, Timken *POSITIVELY ALIGNED ROLLS* and Timken steel perpetuates Timken benefits.

"Timken Bearing Equipped" signifies the difference between waste and conservation, between antiquated and modern—a deciding factor in building and buying mechanical equipment for every purpose—*wherever wheels and shafts turn.*

THE TIMKEN ROLLER BEARING CO.
CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**

College Boy (arrested for speeding): "But, Your Honor, I am a college boy."

Judge: "Ignorance doesn't excuse anybody."

"So you aren't going to marry that school teacher?"

"No. I couldn't show up one night and she wanted me to bring an excuse signed by my parents."

Joe: "Come now, what is the difference between a college gentleman and a cigarette lighter?"

Joan: "All right, what?"

Joe: "It's so hard to get a cigarette lighter lit."

"Have you ever had analyt?"

"I never knew she drank."

Friend: "Old man, I hate to tell you but your wife is fickle."

Husband (yawning): "Ah, she's thrown you down too, eh?"

Dentist: "Your bridge work is terrible."

Victim: "Yeah, that's what my wife tells me."

Have you ever heard the chorus girls' motto: "We never clothes."

"What would happen if we broke one of the commandments?"

"Well, there'd still be nine left."

Then there was the Scotchman who kissed the neighbor's baby every time it finished eating an ice cream cone.

Mother: "My poor Jimmy is so unfortunate, during the track meet he broke one of the college's best records."

"Daddy, I just killed five flies, two male and three female."

"How do you know that that's what they were?"

"Two were on the writing table and three on the mirror."

"How if I kiss you?"

"It's according to how, if you kiss me."

Sign on chemistry laboratory door: "Your clothes eaten off while you wait."

In 1899: "Shall we join the ladies?"

In 1929: "Where the hell's my woman?"

Mandy: "Whut's de matter, Sam? Don't you love me no mo'?"

Sam: "Sho Ah does, honey; Ah's jest restin."

"Yes," said the hard-hearted father, "I'll take her back."

So they passed his plate and grandfather gave him the last piece of chicken.

"Holy gee, Pop," said Clarence, "first I saw a lady animal trainer, and then I saw her dancing bear."

Prof. (fleeing from a lion in the jungle): "This reminds me, I forgot to put the cat out before I left."

Child: "Father, what is an optimist?"

Father: "An optimist, my son, is a man who expects to get a laugh out of my answer."

Him: "Did you ever see a real hot necking party?"

She: "Why, of course not."

Him: "Well, take a good look at me."

College Prexy (awakened by the phone from deep sleep at three A. M.): "Hello."

Voice: "Is this the president?"

Prexy: "Yes."

Voice: "Well, what are you doing up this late?"

"Why do you keep going out with June?

"For the simple reason I like to."

"Like to what?"

"My, but you are covered with gore. How on earth did that happen?"

"Oh, one thing bled to another."

Mrs. Newlywed: "Your wall papering job looks fine dear, but what are those funny bumps?"

Mr. Newlywed: "Good heavens, I forgot to take down the pictures."

She: "Why don't you work your way through college?"

He: "My father has always taught me never to interfere with his affairs."

The New Year at Rose

(Continued from page 20)

A. S. M. E.

THE Rose chapter of the American Society of Mechanical Engineers held its first meeting of the year and elected the following officers: President, William L. Collins, Bakersfield, Calif.; vice president, James Barrett, Terre Haute; secretary, Howard Wills, Worthington, Ind., and treasurer, Robert Mees, Columbus, Ohio. The topics brought under discussion were those pertinent to mechanical engineering and plans were laid to have out of town speakers address their bi-monthly meetings.

A program committee that will be appointed at the next meeting will make arrangements for trips of the student mechanicals to local and nearby industries. Professor Carl Wischmeyer is honorary chairman of the society while John B. Peddle, acting president of Rose Polytechnic Institute, and Professor Henry C. Gray are honorary members of the local chapter.

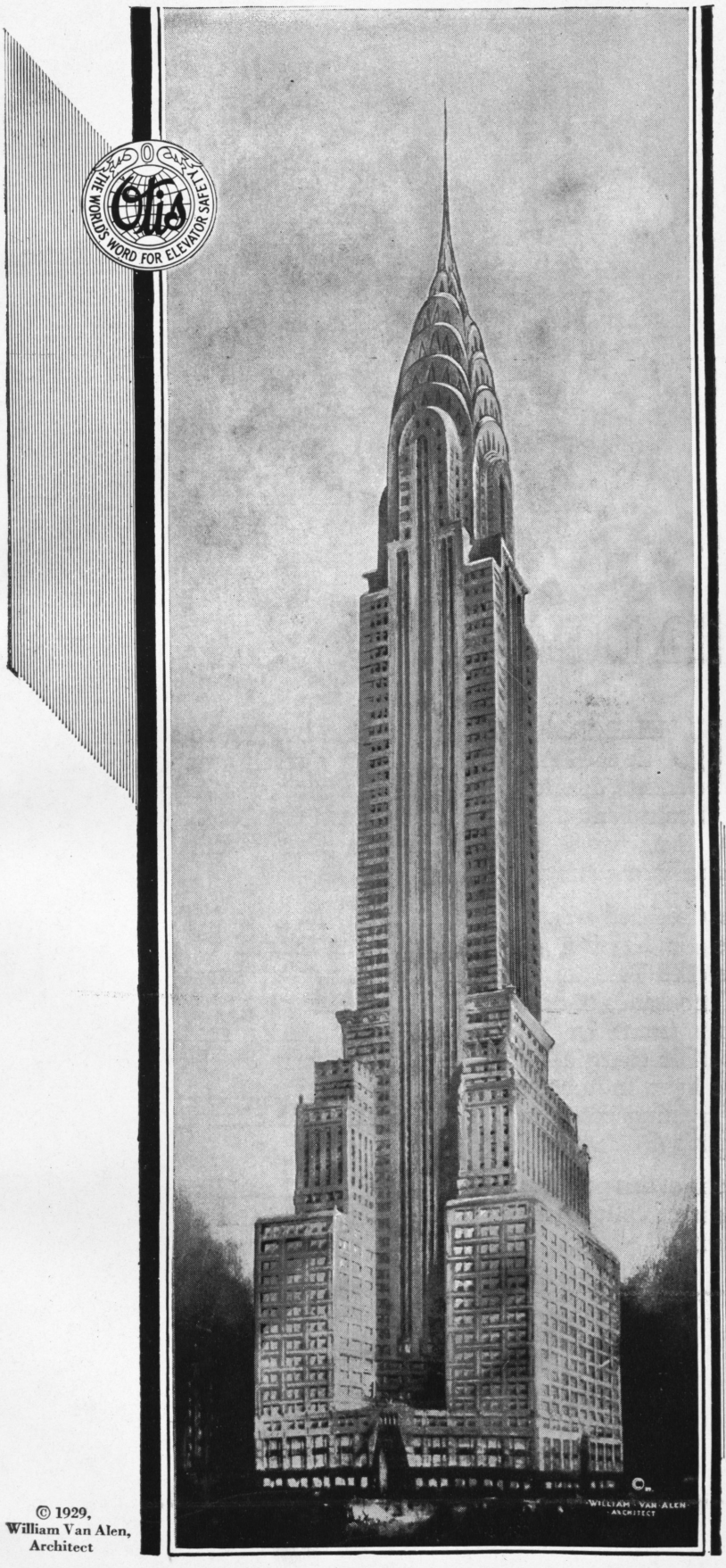
ASSEMBLIES

THE first general assembly of the year was held Sept. 26 and was well attended.

Prof. Wischmeyer, chairman of assemblies, first spoke and gave information about the assemblies and about absences. Prof. Peddle, acting president, was then introduced. He reviewed the improvements made in and about the school and dormitory. He told about the triple automatic safety devices, consisting of bells, gates, and flashing signals, which are to be installed at the interurban crossing at the front entrance to the campus. The old west entrance is to be closed. Prof. Peddle in the course of his talk made several splendid suggestions about the general behavior of the student body. These suggestions, if carried out, would result in great advancement of the welfare of the school.

After Prof. Peddle's talk the new faculty members were introduced. Next on the program was a short talk by Dr. Howlett. He stressed the importance of passing mathematics or making it up in the summer. No assembly with speeches is complete without one from Dr. Sousley, and so Doc was introduced. He handed out a line in his characteristic manner and as usual it was well received. In the latter part of his speech, he mentioned the importance of scholarship, athletics, cleanliness, and modesty, using clever mathematical analogies to illustrate his meaning.

To bring the program to a close Coach Brown was called on for a word about athletics. He said the prospects are fine for a good year in sports at Rose, and that every man should help by supporting the team. We must attend the games and boost for Rose!



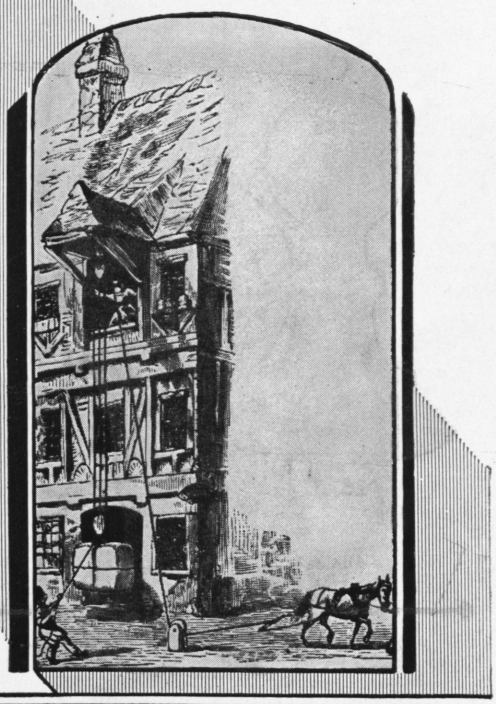
The World's Tallest Building

THE new Chrysler Building in New York will be the tallest building in the world. It will be equipped with thirty Otis Signal Control Elevators.

Here is additional evidence in support of the statement that "most of the world's famous buildings are Otis-equipped."

The world's first safe elevator was an Otis—and today the marvelous Signal Control elevator is an exclusive Otis development.

One of the early phases of Vertical Transportation



OTIS ELEVATOR COMPANY

OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD

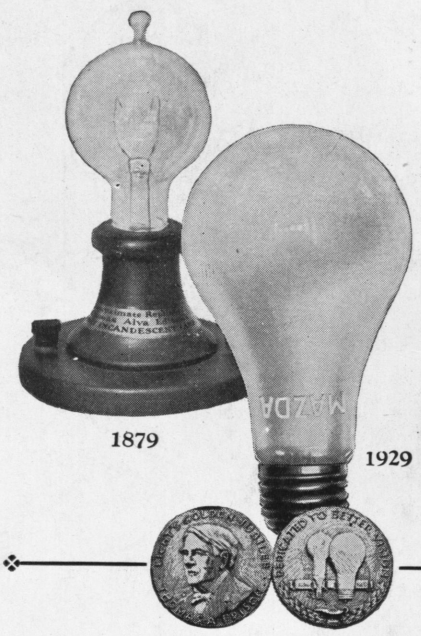
From an engraving of the time in Harper's Weekly

Autumn of '79

WHILE Yale and Princeton were battling to a tie at Hoboken, New Jersey, a small group of scientists, directed by Thomas A. Edison, was busy at Menlo Park, only a few miles away. On October 21, their work resulted in the first practical incandescent lamp.

Few realized what fifty years would mean to both electric lighting and football. The handful who watched Yale and Princeton then has grown to tens of thousands to-day. And the lamp that glowed for forty hours in Edison's little laboratory made possible to-day's billions of candle power of electric light. In honor of the pioneer achievement, and of lighting progress, the nation this year observes Light's Golden Jubilee.

Much of this progress in lighting has been the achievement of college-trained men employed by General Electric.



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